

BASF Aktiengesellschaft

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5 We claim:

- 10 1. A process for the combinatorial production of material samples in the form of a two-dimensional matrix in the surface region of a sheet-like substrate, in which at least two different dispensable material components are dispensed as a suspension from one or more dispensing devices which allow the release of individual suspension drops onto the same point of the substrate, so that materials of different composition are obtained in different surface regions of the substrate.
- 15 2. A process as claimed in claim 1, wherein the sheet-like substrate is arranged horizontally and is charged vertically from above, with the dispensing devices being arranged essentially in such a way that the dispensing directions are in a plane which is perpendicular to the sheet-like substrate or angled thereto.
- 20 3. A process as claimed in claim 1, wherein the dispensing is carried out by displacing movable plungers in the dispensing device.
- 25 4. A process as claimed in claim 1, wherein the dispensable material components are firstly dispensed and mixed on an auxiliary substrate, and the mixture is then taken up by the dispensing device and dispensed onto the substrate.
- 30 5. A process as claimed in claim 1, wherein the dispensable material components are selected from suspensions of powders of the elements from groups IB, IIB, IIIB, IVB, VB, VIB, VIIB and VIII, lanthanoids, actinoids, IA, IIA, IIIA, IVA, VA and VIA of the Periodic Table of the Elements, or compounds or mixtures thereof.
- 35 6. A process as claimed in claim 1, wherein the sheet-like substrate is divided into individual defined positions which are spatially delimited from one another.
7. A process as claimed in claim 6, wherein the sheet-like substrate is divided into individual defined positions through the dispensing taking place on the substrate at

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a spatial separation which prevents dispensed suspension drops coalescing on the substrate.

- 5 8. A process as claimed in claim 6, wherein the sheet-like substrate is divided into individual defined positions through the sheet-like substrate being laid on a matrix plate provided with holes, the dispensing taking place into the holes, the dispensed suspension drops being dried at least to the extent that they do not coalesce on the substrate when the matrix plate is lifted off, and the matrix plate being lifted off after this drying.
- 10 9. A process as claimed in claim 6, wherein a total of from 1 to 1000 μl of suspension are dispensed per position on the substrate.
- 15 10. A process for the combinatorial testing of material samples obtained by a process as claimed in claim 1, in which the material samples present at individual defined positions of the substrate are analyzed for a desired property using physical and/or chemical methods.
- 20 11. An apparatus for carrying out a process as claimed in claim 1, comprising a robot arm which can be moved under computer control and which carries one or more dispensing devices with a capacity of from 1 to 1000 μl , and a computer for controlling the robot arm.